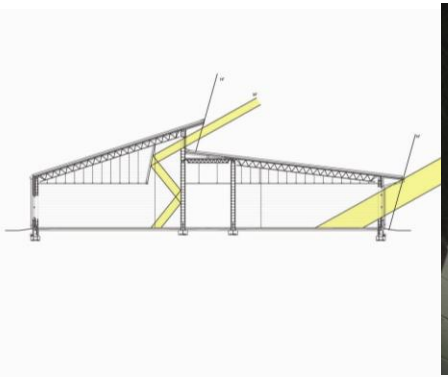
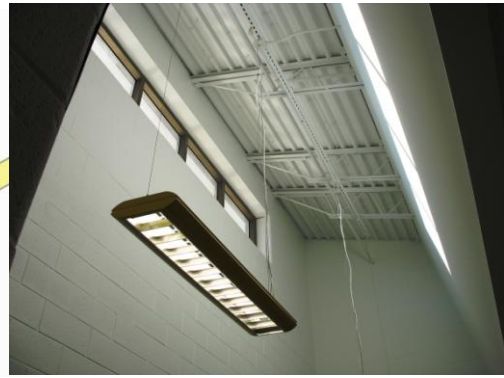
High Performance Sustainable Schools

Update and Next Steps

SUSTAINABLE DESIGN

- STEPS TAKEN
- LESSONS LEARNED
- NEXT STEPS





March 7 - 2007

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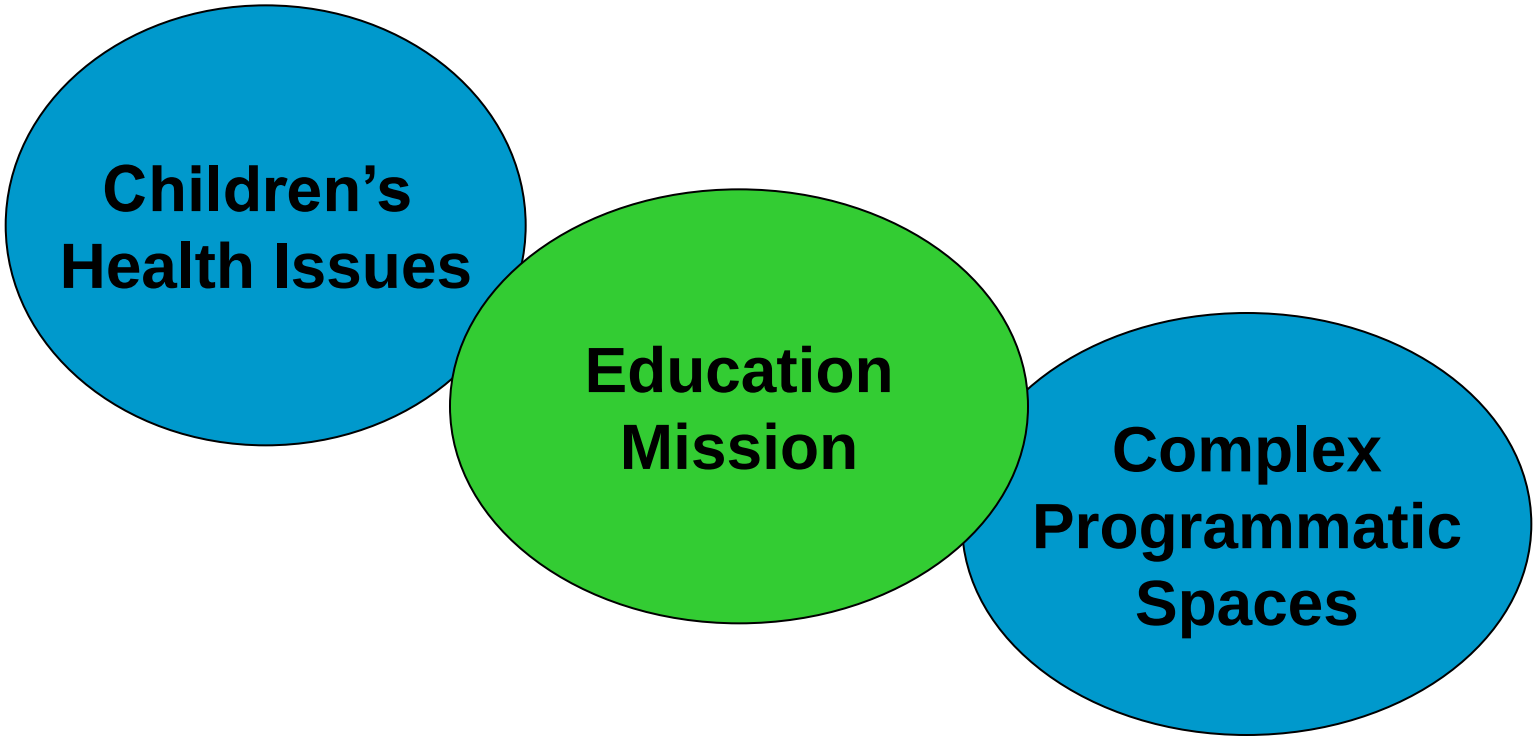
High Performance Sustainable Schools

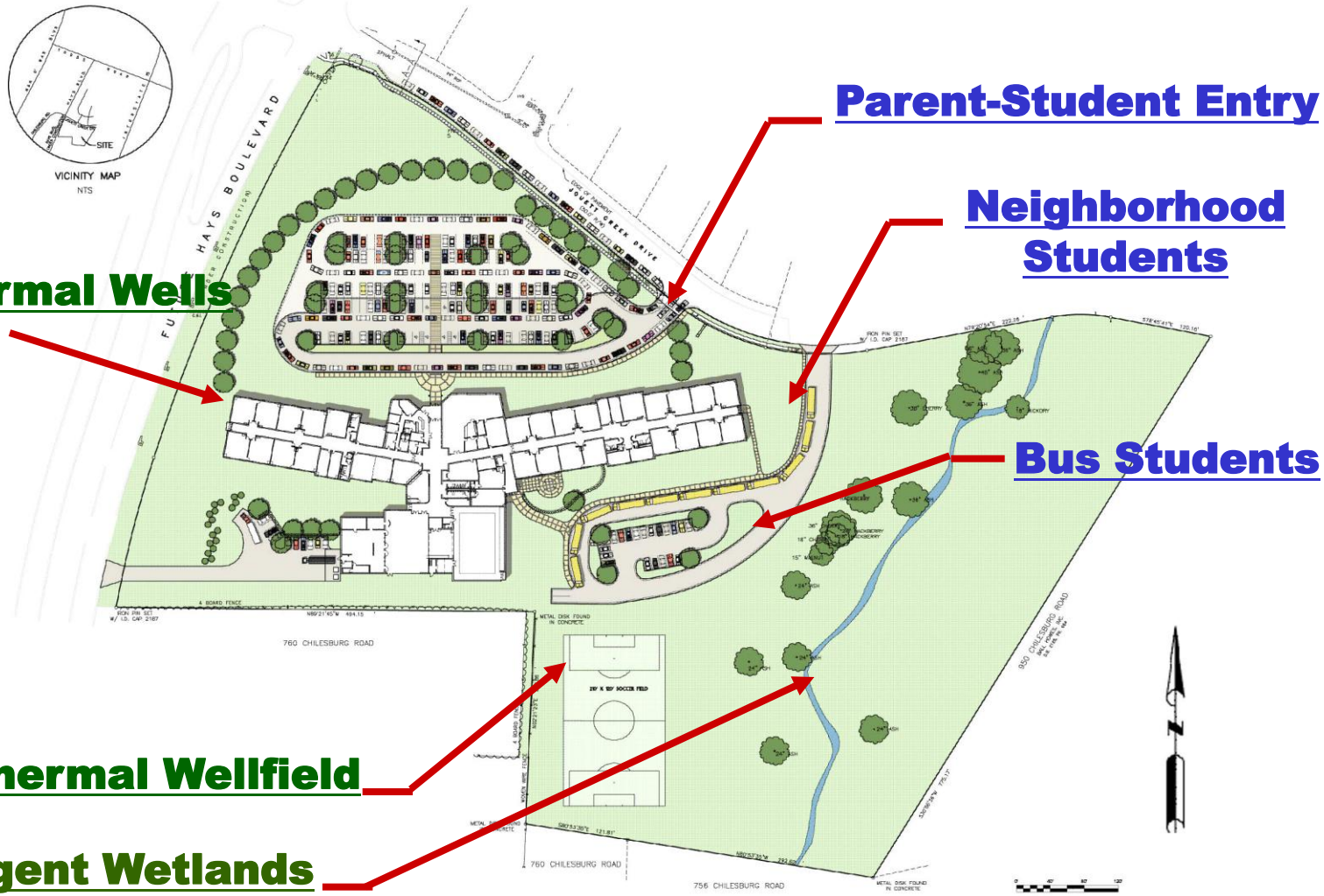
What makes Schools different from other building types?



Integrated Approach

High Performance Sustainable Schools

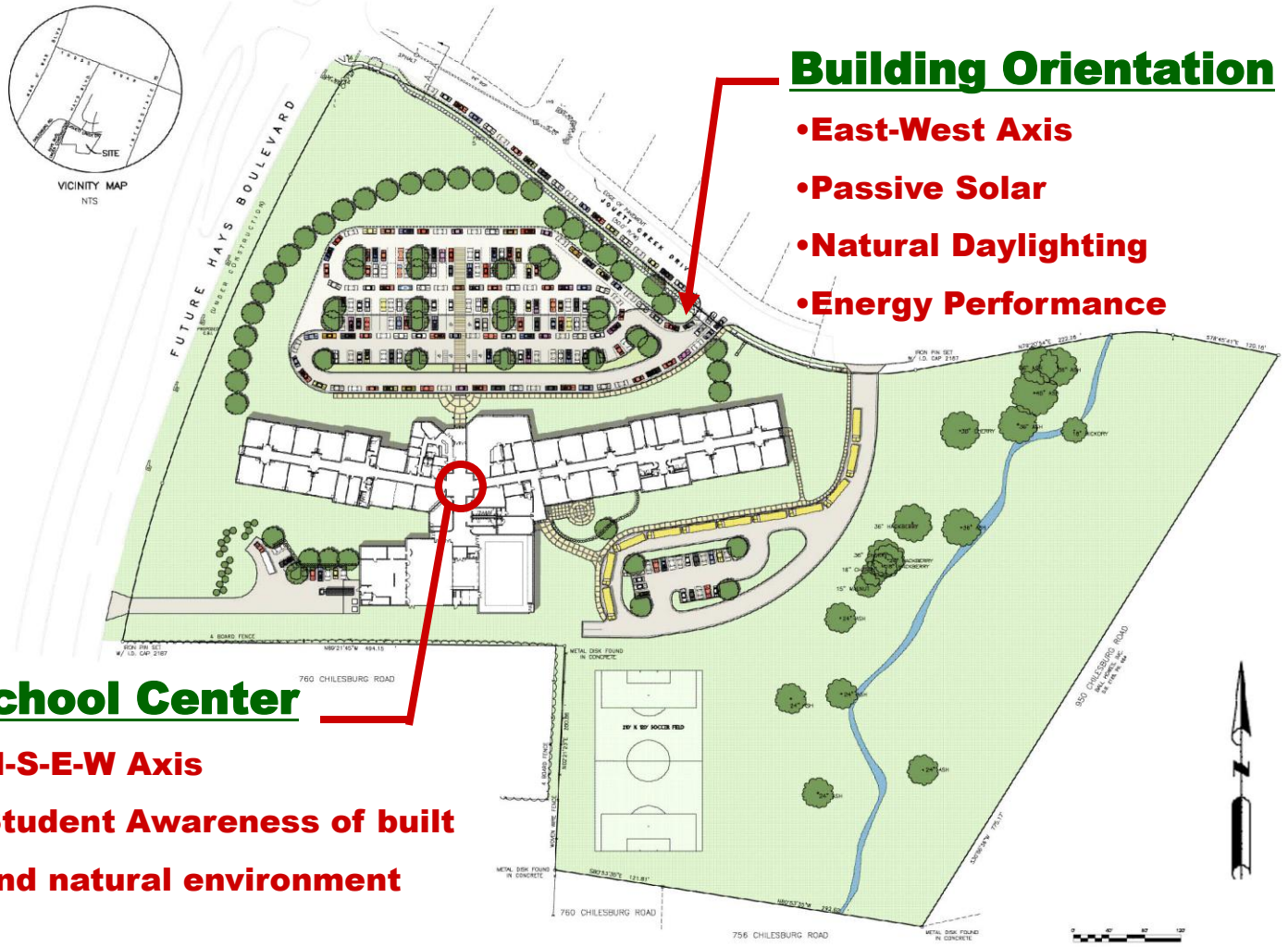
Athens-Chilesburg Elementary



SITE DEVELOPMENT – Site + Energy

High Performance Sustainable Schools

Athens-Chilesburg Elementary



Building Orientation

- East-West Axis
- Passive Solar
- Natural Daylighting
- Energy Performance

School Center

- N-S-E-W Axis
- Student Awareness of built and natural environment

SITE DEVELOPMENT – Building Orientation

High Performance Sustainable Schools

Athens-Chilesburg Elementary

- **Classroom Windows: 84 SF = 10.5% Total Floor Area**
- **Classroom + Commons Clerestories**
- **Cupola at school center**
- **Controlled Entry: Deep Roof Overhangs**

Daylighting

High Performance Sustainable Schools

Athens-Chilesburg Elementary

Windows
+
Clerestories

DIMMING

Lutron Eco: Balance LC

Teachers' Control - Manual Dimming

- **Daylight Sensors**
- **Ballasts – network: digitally addressable**
- **Occupancy Sensors**
- **Energy Savings - monitor**
- **Individual Classrooms, not central control**

PASSIVE SOLAR

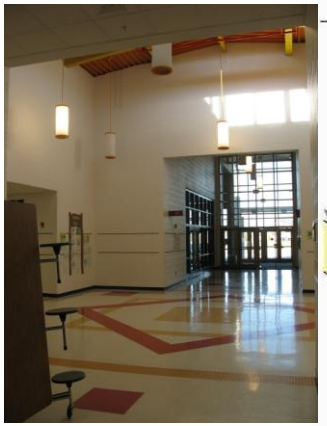
- **Thermal Comfort**
- **Energy Savings**

Daylighting

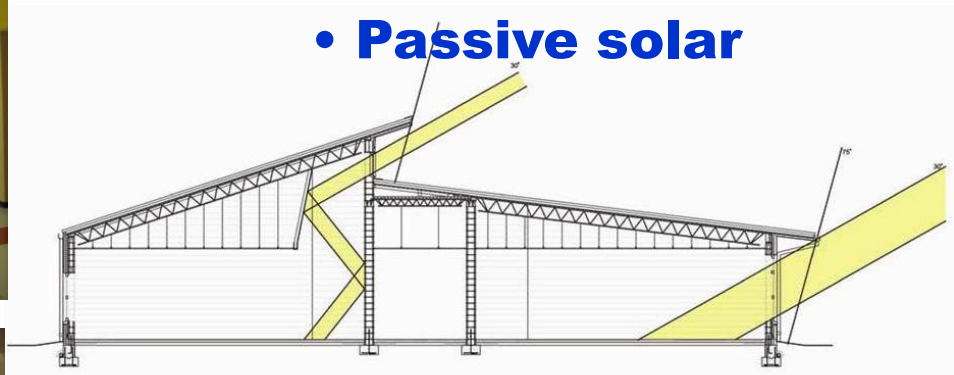
High Performance Sustainable Schools

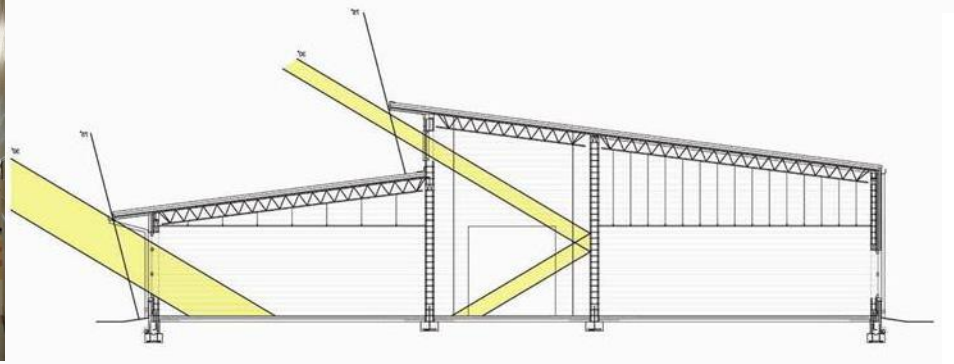
Athens-Chilesburg Elementary

Windows + Clerestories



- Roof Overhangs
- Daylighting
- Controlled Entry
- Passive solar





Daylighting + Views

High Performance Sustainable Schools

Athens Chilesburg Elementary

LESSONS LEARNED

- **Building Orientation**
  - Long axis oriented E-W, to maximize N-S light and minimize difficult West sun.
- **Geo-Thermal System**
  - Fully grout around piping, bottom to top, to fill voids
- **Occupant Sensors**
  - Not always cost effective, depends on use of building
- **Daylighting**
  - Staff and Faculty education of design intentions
- **Dimming System**
  - Takes time to “adjust”. Teacher involvement/ Lamps still a leak link.
- **Materials + Resources**
  - Low Maintenance Gym Flooring
  - Low / No VOC paints

High Performance Sustainable Schools

Athens Chilesburg Elementary

COSTS + BENEFITS

- **Building Orientation**
  - No increase in cost
- **Geo-Thermal System**
  - +/- $4.50/sf. 8-12 yr payback. Outside Air requirements
- **Occupant Sensors**
  - No always cost effective, depends on use of building
- **Daylighting + Windows**
  - Windows more expensive than masonry wall. Light - a potential savings.
- **Dimming System**
  - Currently being monitored. Other projects show the following:
  - Daylight sensors – 23% savings
  - Occupancy Sensors – 17% savings
  - Manual Dimming – 10% savings
- **Materials + Resources**
  - Low / No Maintenance makes life cycle costs lower.

OWNER + A/E TEAM

Most districts managing limited public funds with broad needs.
Owners very responsive to green design showing 7-10 yr payback.

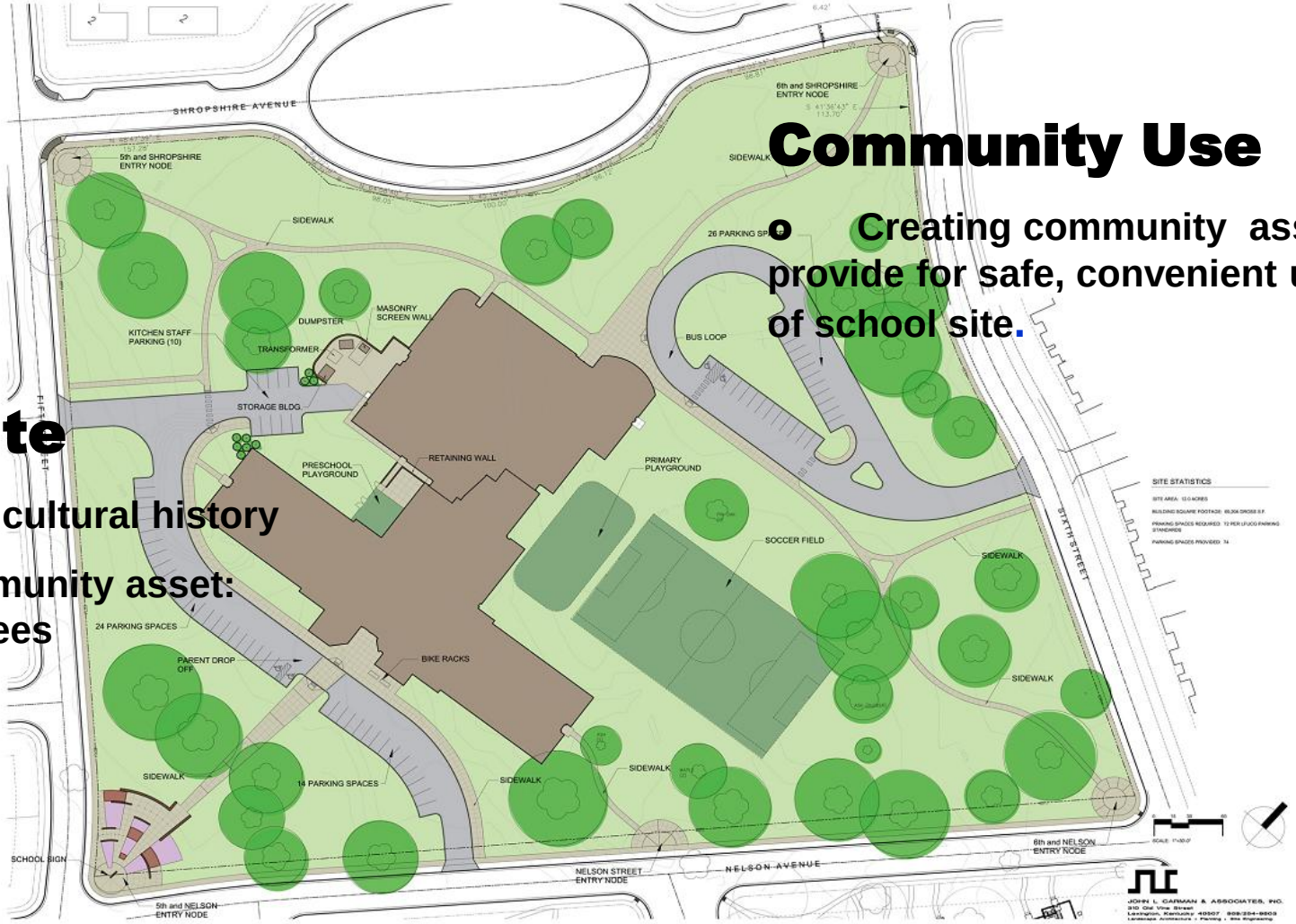
- **Discuss Design Approaches + Value to District**
- **Discuss how building is to be used**
- **Allow time – some learning curve involved.**
- **Establish understanding vocabulary –**
  High Performance, Green, sustainable, LEED, EnergyStar
- **List Energy + Environmental considerations**
- **Review Life Cycle Costs**
- **Set Priorities**

Reasons for Major Construction

(1) to improve student learning environment
(2) to reduce energy cost

High Performance Sustainable Schools

Bluegrass Aspendale Community Elementary



Community Use

- Creating community asset: provide for safe, convenient use of school site.

Existing Site

- Acknowledging cultural history
- Protecting community asset: existing mature trees
- Grade balance

Some Next Steps

NEXT STEPS

- **Site Development**
  - Light Pollution Reduction
- **Water Use Reduction**
  - Water efficient landscaping
  - Storm Water Control
- **Waste Management**
  - Contractor process – cost effective for Owner and Contractor
  - On-Site recycling - needs local public / private partners
  - Reuse of removed trees
- **Materials + Resources**
  - Better understanding of Life Cycle Costs
  - Low-emitting materials + mastics
- **Daylighting**
  - Light Shelves on Vertical Openings

High Performance Sustainable Schools

- ***Optimize the combined impact of all design elements***
- ***Optimize to achieve long term value and performance***
- ***Create an enduring asset to the community***

It is ALL about the kids.

High Performance Sustainable Schools

- *Ancient ways of building*
- *Not new trendy approach*
- *Integration of environment + technology*

Sustainable Design